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tain universities.—From the report of Trustee Robert T. Morris, printed in the *Cornell Alumni News*.

SCIENTIFIC BOOKS

Water: Its Origin and Use. By WILLIAM COLES-FINCH, Resident Engineer to the Brompton, Chatham, Gillingham and Rochester Water Company, Kent, England. New York, D. Van Nostrand Co., Publishers. 1909. Pp. xxi + 483. \$5.

This book is not a scientific record, but written from the standpoint of an engineer professionally interested in the finding and distribution of water. Accompanying the text are numerous illustrations of mountain and glacier scenery from the original pictures of Mrs. Aubrey Le Blond (Mrs. Main), and also photographs and diagrams illustrating the engineering work of the author. Mr. Coles-Finch makes no claim to originality, but he has put together in an interesting and readable form a great deal of information on a very wide subject. A copious index adds to the value of the work.

The book opens with a discussion of solar heat, which is really the cause of water in all its forms, and the atmosphere, "without which nothing could live, nothing could burn, nothing could grow; without which no sound could be heard, and there could be no rain."

The average annual rainfall of the globe is computed to be 33 inches. In Assam from 600 to 805 inches have been recorded, while in the Sahara desert, part of Arabia, the desert of Gobi, and portions of Mexico, Chili and Peru it has seldom been known to rain. It seems to be the fact that the atmosphere of the earth is growing drier. The glaciers are retreating, the Caspian Sea and many other lakes are growing smaller, and the great deserts seem to be extending. Some of the richest countries on earth have seen their fertility decreasing, mainly owing to the ruthless destruction of their forests.

Ruined forests mean flooded rivers, periodic droughts, eroded soil and dried-up springs. . . . Many bodies having control of large tracts of land, such as water boards, are planting their catchment areas with trees with advantage and

profit; for it is found that the presence of trees adds to the retention of water falling as rain as well as by radiation and cooling the adjacent atmosphere, causing condensation and rain; it prevents floods, regulates and purifies the supply, for water from wooded areas is generally purer than that falling on bare land.

Three chapters are given to the story of snow, ice and glaciers. The different forms of ice are described, from the silver thaw or "glazed frost," which is "neither hail, hoarfrost nor snow, but rain, each drop of which solidifies as it touches any solid body," to the vast fields of ice formed in polar regions, rising to a height of 3,000 feet or more, and the glaciers, formed by the congelation and compression of the mountain snow, and which in their movement over the northern portions of Europe, Asia and America during the glacial period, mixed together the elements of different districts, disintegrated them, carried them over and deposited them on the hard chalk, rock and other foundations, covering them with rich soil well adapted for the growth of vegetation.

Having followed atmospheric water through the process of evaporation and the various forms in which it reaches the earth, the next five chapters trace its passage through the soil and rocks on its way back to the sea. On their way these streams carry material from one location to another, slowly raising new continents, and gradually but surely changing the configuration of the earth's surface by the formation of bars, estuaries, lagoon and sandbanks.

But the work of rain, rivers and waterfalls is as nothing compared with that of the sea.

The billows of the ocean agitate the loose material on the shore, wearing away the coast with endless repetitions of this act of power and imparted force; the solid portion of our earth, thus sapped to its foundations, is carried away into the deep, and sunk again at the bottom of the sea, whence it had originated, and from which, sooner or later, it will again make its appearance. (Dr. Hutton.)

The last chapters of the book are devoted to a discussion of the methods by which water is obtained and stored for domestic and mechan-

ical purposes, and for irrigation in regions where long droughts are periodically experienced. In many such localities, by means of "storing, diverting and distributing the flood water of a river or rivers," the land has been reclaimed from the desert and made capable of supporting a large and prosperous population.

F. P. GULLIVER

Die Palaeobotanische Literatur-Bibliographische Übersicht über die Arbeiten aus dem Gebiete der Palaeobotanik. Von W. J. JONGMANS. Erster Band: Die Erscheinungen des Jahres 1908.

Gustav Fischer, of Jena, has just issued the first volume of a proposed annual bibliography and index of contributions to paleobotany compiled by W. J. Jongmans, of the Royal Herbarium at Leiden.

In considering a work of this sort one naturally surveys the field that it aims to cover and what agencies already attempt to cover this field. General paleobotanical reviews published periodically were commenced by the late Marquis Saporta and ably continued after his death by Professor Zeiller in the *Revue Générale de Botanique*. These have always been valuable summaries of paleobotanical progress. The *Geologisches Centralblatt* attempts to cover paleobotanical literature but the work is so poorly done and incomplete that it is of little value. The *Botanisches Centralblatt* covers the field of paleobotany much more thoroughly, but there are so many contributors that the reviews lack balance, an insignificant paper often occupying more space than one of importance. The Royal Society catalogue attempts to cover the paleobotanical field in much the same manner as the work under discussion, the chief criticism in the case of the former being the slowness of publication, the very serious number of omissions and the over-elaborated system of arrangement and citation.

In addition to these general bibliographies the Torrey Botanical Club publishes each month a briefly annotated bibliography of contributions to American botany, including

paleobotany, and the United States Geological Survey publishes at intervals bibliographies by years of contributions to American geology and paleontology also covering paleobotany and indexed systematically, but neither of these in so far as they refer to fossil plants are as well done as the work before us, and the limited field they cover make them far less valuable, particularly since it is not difficult to keep up with what is coming out in one's own country.

It would appear then that there is a distinct opportunity for an annual publication of just the kind that Jongmans has given us.

The first part contains an alphabetical catalogue of the papers which have appeared in 1908, arranged by authors, and in a rather careful examination no omissions have been discovered, although it is too much to expect that there are none such. A minor defect noticed is that the same work, as for example Engler's *Jahrbuch* is cited in several different ways. The second part, also arranged alphabetically, is a systematic list of species, genera and other botanical groups described or merely referred to by the various authors in their comparative discussions, including also the living plants with which the fossil plants are compared, and the various geological horizons. A chance quotation will show the character and scope of this part: "*Alethopteris lonchita* Schl.—Karbon, North Derbyshire—Horwood (2), p. 6, Pl. A, Fig. 1." Synonyms are given a place and their equivalence as determined by the various authors are indicated, so that the work is a complete compendium of all that is being done along paleobotanical lines throughout the world, and the reader can get a very tolerable, even if skeletal, idea of the character and contents of every paper published, something that it is not always easy to do from the titles of papers.

If the high standard of this first volume is continued and subsequent years appear more promptly the work will prove well nigh indispensable to every student who wishes to keep informed of the rapidly increasing flood of paleobotanical investigation. The author and